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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,649	07/02/2003	Joo Sun Yoon	21C-0058	5474

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EXAMINER

DUONG, THOI V

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 08/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/612,649

Applicant(s)

YOON ET AL.

Examiner

Thoi V. Duong

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 ~~is~~/are pending in the application.
- 4a) Of the above claim(s) 8-13 and 19-23 ~~is~~/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 14-18 ~~is~~/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) None
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the reply filed June 06, 2006.

Currently, claims 1-23 are pending in this application; of these claims, claims 8-13 and 19-23 are withdrawn and claims 1-7 and 14-18 are considered in this office action.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 5, 7, 14, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art (Figs. 1-4) in view of Kubota et al. (Kubota, USPN 6,771,334 B2).

Re claim 1, as shown in Figs. 1-4, Applicant's Prior Art discloses a reflective-transmissive type liquid crystal display device, comprising:

a first substrate 11, including:

a thin film transistor 12 disposed on a first transparent substrate 11,

an organic insulation layer 13 disposed on the first transparent substrate 11 to insulate the thin film transistor 12, the organic insulation layer 13 having a contact hole 13a for exposing an output terminal of the thin film transistor (page 3, lines 13-16),

a pixel electrode 14 having a transparent electrode 14a connected to the output terminal 12d of the thin film transistor 12 through the contact hole 13a disposed on the

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organic insulation layer 13 (page 3, lines 17-24), and a reflective electrode 14b disposed on a first region of the transparent electrode 14a (reflective display region), a second region 14c of the transparent electrode 14a being exposed without being covered by the reflective electrode 14b (transmissive display region) (page 4, lines 4-10), the second region 14c including a first boundary, wherein the first boundary is a boundary between the first and second regions 14b and 14c as shown in Figs. 2-4, and an orientation film 15 coated on an upper surface of the pixel electrode 14 and having an orientation groove rubbed in a first direction 15a toward the second region 14c (page 4, lines 13-22);

a second substrate 21, including:

a color filter 22 disposed on a second transparent substrate 21 in opposition to the pixel electrode 14, and

a common electrode 23 disposed on an upper surface of the color filter and facing the pixel electrode 14, and

a liquid crystal 30 interposed between the first and second substrates.

Re claim 14, as shown in Fig. 1, Applicant's Prior Art discloses a method for fabricating a reflective-transmissive type liquid crystal display device, the method comprising:

forming a thin film transistor 12 on a first transparent substrate 11,

depositing an organic insulation layer 13 on the first transparent substrate 11 to insulate the thin film transistor 12, the organic insulation layer 13 having a contact hole

13a for exposing an output terminal 12d of the thin film transistor 12 (page 3, lines 13-16),

forming a pixel electrode 14 on the organic insulation layer 13, the pixel electrode 14 having a transparent electrode 14a connected to the output terminal 12d of the thin film transistor 12 through the contact hole 13a (page 3, lines 17-24) and a reflective electrode 14b formed on a first region of the transparent electrode 14 (reflective display region), a second region 14c of the transparent electrode 14 being exposed without covering by the reflective electrode 14b (transmissive display region) (page 4, lines 4-10), the second region 14c including a first boundary, wherein the first boundary is a boundary between the first and second regions 14b and 14c as shown in Figs. 2-4;

coating an orientation film 15 on an upper surface of the pixel electrode 14;

rubbing the orientation film 15 in a first direction 15a toward the second region 14c to form an orientation groove on the orientation film (page 4, lines 13-22).

forming a color filter 22 on a second transparent substrate 21 in opposition to the pixel electrode 14,

forming a common electrode 23 on an upper surface of the color filter 22, the common electrode 23 facing the pixel electrode 14, and

interposing a liquid crystal 30 between the common electrode 23 and the pixel electrode 14 on which the orientation film 15 and the orientation groove are formed.

However, Applicant's Prior Art does not show the second region including a second boundary where the second boundary is a remaining boundary of the second region except for the first boundary as recited in claims 1 and 14.

As shown in Fig. 3 (annotated in page 12), Kubota discloses a reflective-transmissive type liquid crystal display device comprising a pixel electrode 3 including an electrode for a reflective display 3a (reflective electrode) disposed on a first region (reflective display region) and an electrode for a transmissive display 3b (transmissive electrode) disposed in a second region (transmissive display region) without being covered by the reflective electrode (col. 8, lines 14-21); and an alignment layer 7(7a, 7b) coated on an upper surface of the pixel electrode 3,

wherein the second region includes a first boundary and a second boundary, where the first boundary is a boundary between the first and second regions and the second boundary is a remaining boundary of the second region.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Applicant's Prior Art with the teaching of Kubota by forming a pixel electrode having a reflective electrode formed in the first region and a transparent electrode formed in the second region, the second region including a first boundary and a second boundary where the first boundary is a boundary between the first and second regions and the second boundary is a remaining boundary of the second region in order to obtain a splay alignment and a hybrid alignment of the liquid crystal molecules respectively in the transmissive display region and the reflective display region, and hence to provide a display with excellent quality due to controlling the alignment of liquid crystal molecules (col. 3, lines 13-18 and col. 11, line 66 through col. 12, line 6).

Since Applicant's Prior Art in view of Kubota has the same structure with the instant invention, claimed properties or functions recited in claims 1 and 14 are presumed to be inherent (see MPEP 2112.01); therefore, it is obvious that the orientation groove rubbed in a first direction toward the second region including the first boundary and the second boundary also prevents impurity from being stacked at the first boundary of the transparent electrode.

Re claim 2, as shown in Fig. 4 of Applicant's Prior Art, the first boundary of the transmissive display region 14a and the reflective display region 14b includes at least two vertical straight lines in a layout of the pixel electrode 14,

wherein, re claim 3, the first direction 15a is parallel to two vertical straight lines of the first boundary of the transmissive display region 14a and the reflective display region 14b.

Re claim 5, as shown in Figs. 2-4 of Applicant's Prior Art, the second region 14c exposes two edges of the first region 14b of the transparent electrode 14a, and the two edges, one of the vertical edges and one of the horizontal edges of the first boundary of the second region 14c, are connected to each other,

wherein, re claim 7, the first boundary and the first region each an L-shaped configuration.

Re claim 15, forming a pixel electrode 14 in the method for fabricating a reflective-transmissive type liquid crystal display device of Applicant's Prior Art comprises (page 3, line 17 through page 4, line 10):

forming the transparent electrode 14a on the first transparent substrate 11 on which the thin film transistor 12 and the organic insulation layer 13 are formed;

forming a metal thin film on an upper surface of the transparent electrode; and
patterning the metal thin film such that the reflective electrode 14b is formed on the first region of the transparent electrode 14a and the first boundary between the first and second regions (boundary of the opening 14c) has a linear shape (squared shape) in a layout of the pixel electrode (Figs. 2-4).

Re claim 17, forming a pixel electrode 14 in the method for fabricating a reflective-transmissive type liquid crystal display device of Applicant's Prior Art comprises (page 3, line 17 through page 4, line 10):

forming the transparent electrode 14a on the first transparent substrate 11 on which the thin film transistor 12 and the organic insulation layer are formed,

forming a metal thin film on an upper surface of the transparent electrode 14a,
and

patterning the metal thin film such that the reflective electrode 14b is formed on the first region of the transparent electrode and the second region exposes two edges of the transparent electrode 14a, the two edges, one of the vertical edges and one of the horizontal edges of the boundary of the second region 14c, being connected to each other (Figs. 2-4).

4. Claims 4, 6, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Prior Art in view of Kubota et al. (Kubota, USPN

6,771,334 B2) as applied to claims 1-3, 5, 7, 14, 15 and 17 above, and further in view of Kubo et al. (Kubo, USPN 6,452,654 B2).

Applicant's Prior Art in view of Kubota discloses a reflective-transmissive type liquid crystal display device as well as a method for fabricating the same that is basically the same as that recited in claims 4, 6, 16 and 18 except for forming the sidewall inclined (slanting) to prevent the impurity from being stacked at the boundary.

As shown in Figs. 8A and 8B, Kubo discloses a reflective-transmissive type liquid crystal display device comprising a pixel electrode having a transparent electrode 51 and a reflective electrode 50 disposed on a first region of the transparent electrode 51 (both sides of the transparent electrode 51) and a second region of the transparent electrode 51 (middle portion of the transparent electrode 51) being exposed without being covered by the reflective electrode 50,

wherein the reflective electrode 50 includes a sidewall making contact with the (first) boundary of the first and second regions, and the sidewall is inclined as shown in Figs. 8A and 8B.

Since the structure of the reflective electrode of Kubo is the same as that of the invention, claimed properties or functions are presumed to be inherent (see MPEP 2112.01); therefore, it is obvious that the inclined sidewall also prevents the impurity from being stacked at the boundary of the first and second regions.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the Applicant's Prior Art with the teaching of Kubo by forming an inclined sidewall of the reflective electrode at the first region

adjacent to the first boundary for not only preventing the impurity from being stacked at the sidewall of the reflective electrode but also improving the aperture ratio of the pixel (col. 14, lines 48-55).

Response to Arguments

5. Applicant's arguments filed June 06, 2006 have been fully considered but they are not persuasive.

Applicant argued that Applicant's Prior Art (APA) does not disclose an orientation film coated on an upper surface of the pixel electrode and having an orientation groove rubbed in a first direction toward the second boundary and Applicant find no disclosure in Kubota of an orientation groove or anything relating to rubbing directions relative to the pixel electrode 3, the alignment films 7, 8, the substrates or any other feature of Kubota.

The Examiner disagrees with Applicant's remarks since, as shown in Figs. 1-4, APA suggests a reflective-transmissive type LCD device comprising an orientation film coated on an upper surface of the pixel electrode 14 and having an orientation groove rubbed in a first direction 15a toward the second region as a transmissive display region and Kubota is employed for teaching a reflective-transmissive type LCD device comprising a structure having a first region as a reflective display region and a second region as a transmissive display region which includes a first boundary and a second boundary, where the first boundary is a boundary between the first and second regions and the second boundary is a remaining boundary of the second region except for the first boundary as shown in the annotated figure 3.

Accordingly, it is obvious that the structure of Kubota where the second region includes the second boundary can be applied to the reflective-transmissive type LCD device of APA in order to provide a display with excellent quality due to controlling the alignment of liquid crystal molecules. It is also obvious that, with the modification, the orientation film has an orientation groove rubbed in a first direction toward the second region boundary since the second boundary is included in the second region.

Thus, the requirements of prima facie obviousness are met since APA in view of Kubota produces the claimed invention.

Finally, Kubo is employed for teaching an inclined side wall of the reflective electrode for not only preventing the impurity from being stacked at the sidewall of the reflective electrode but also improving the aperture ratio of the pixel.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thoi V. Duong whose telephone number is (571) 272-2292. The examiner can normally be reached on Monday-Friday from 8:30 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms, can be reached at (571) 272-1787.

Thoi Duong



08/14/2006



DUNG T. NGUYEN
PRIMARY EXAMINER

Fig. 3

